THE BURMANNIACEÆ OF THE MALAY PENINSULA.

BY

H. N. RIDLEY, M.A., F.L.S.

THE curious little plants known as *Burmanniaceæ*, though distributed over the whole tropical world, seems to be most abundant in the Malayan region. A large number of very extraordinary forms have been described and figured by Professor BECCARI, in "Malesia," vol. i, from the specimens collected by him in Borneo, New Guinea and other Malayan islands. Only three kinds are included in the "Flora of British India" from the Malayan Peninsula, but these are not all that occur here. At present seven species are known to be found within this region, representing three genera, and more will surely be found as the botany of the Peninsula is worked up. These plants are constantly neglected by collectors, as they are usually difficult to find and very inconspicuous, and furthermore some of them require to be preserved in spirits of wine, being indeed so succulent that they shrivel up to nothing when an attempt is made to dry them. They should be carefully sought for in deep forests, at the roots of large and old trees. Frequently two or three kinds grow in one spot. Thus if *Burmannia tuberosa* is found growing in the jungle, it is probable that *Gymnosiphon* and perhaps *Thismia* are close at hand, and should be carefully looked for.

The three genera which are found in the Peninsula are *Burmannia*, five species; *Gymnosiphon* and *Thismia* one each. The *Burmannias* may be divided into two sections—saprophytic and non-saprophytic. The latter grow in open places, among grass, etc., the former in the dense jungle as aforesaid,

among dead leaves. Like all true saprophytes they have no green leaves, but the whole plant is white or yellowish, with the leaves reduced to scales. *Thismia* and *Gymnosiphon* are also saprophytic. The plants of the former genus are peculiarly soft and succulent and very curiously shaped. Two species occur in Singapore.

Gymnosiphon is an exceedingly delicate and fragile plant with a slender wiry stem about three inches tall and little violet flowers.

The relations of these little plants with other orders is still most obscure. Hitherto they have been associated with orchids, owing to a misconception as to the structure of the seed. It is probable that they are most nearly related to the *Liliaceæ*, and especially the curious *Taccaceæ* of which the so-called black Chendrian Lily (*Atacca cristata*) is a common plant in our jungles.

BURMANNIA.—Five species are known from the Peninsula, viz., *B. longifolia* (Becc.), *B. disticha* (Linn) and *B. cœlestis* (Don.), non-saprophytes; and *B. tuberosa*, (Becc.), and *B. gracilis*, Ridl. saprophytes. The first two of these are alpine plants growing on the high mountains of Perak and Mount Ophir, and both are apparently perennials. *B. cœlestis* (Don.), is a small annual, very common in grassy spots.

B. LONGIFOLIB (Becc.), Malesia, i, 244, t. 13, fig. 1-5; Flora of British India, vol. vi, p. 664.

A perennial plant with a tall, leafy stem creeping at the base, the leaves are narrow and grass-like, acute, recurved. The flower-spike erect, with two short branches at the top covered with nodding whitish yellow flowers half-an-inch long. The wings of the flower, so large in *B. cœlestis*, are very small and obscure.

Perak and also Borneo and Java.

B. DISTICHA (Linn., Sp., Pl. 287) has a distinct creeping stem like that of the preceding, but shorter and the leaves are tufted at the base. They are about three inches long, grassy and pointed, about $\frac{1}{4}$ inch across. The whole plant is a foot and-a-half tall, and the stem terminates in an erect forked cyme with branches about $1\frac{1}{2}$ inch long and almost sessile flowers. The flowers are large and blue, erect, twenty on a branch.

about half an inch long, with very distinct wings. The sepals are fleshy, linear lanceolate. The petals nearly as large, blunt. The stamens are sessile at the base of the petals with a very distinct bilobed dentate crest. The anther cells far apart, reniform. The style rather stout, the three stigmas fairly large. The ovary is very large in proportion to the size of the flower, a good deal longer than the style.

This is a widely distributed plant in the Tropics of Asia, occurring in mountainous districts from Nepaul throughout India to Ceylon, Sumatra and China and Australia. At present it has only been gathered on Mount Ophir in the Malay Peninsula, but it will certainly be found in other of our mountain regions.

B. CŒLESTIS (Don.) is a very widely distributed little annual. It is very common in grassy spots along roadsides. I have seen great plenty of it along the road towards Pasir Panjang, and it is also very common in the turf in the Botanic Gardens. It is not, however, always to be met with, being an annual in the strict sense, that is, it only lives till it has flowered and fruited, and then immediately dies. In Europe, where the growing season is so short, it would probably be literally an annual, and live throughout the summer, dying down in autumn or winter as so many English plants do, but as there is really no time when plants cannot grow here, this little Dragon's-scales appears whenever the weather suits it, lives a short life, of perhaps a month or two, and disappears again. It generally appears after heavy rains when the weather begins to get finer, and then the ground is often dotted all over with it.

The whole plant is about three to four inches tall, sometimes as much as six inches, often, in poor soil, much smaller. It has a simple slender stem with a tuft of narrow pointed leaves at the base, and one, more rarely two, and still more rarely three or more flowers, about half an inch long at the top. These flowers have the typical *Burmannia* shape, that is to say, they are urn-shaped with three thin wings running for the whole of the length. At the top are three little sepals, and alternating with these three minute petals. The stamens and pistil are quite hidden in the urn. The flower is of an exquisite lilac-blue, with yellow sepals. The stamens are

fixed to the side of the urn and each consists of an anther, the two cells of which are oval in shape, and split transversely. They are separated by a broad connective which is crested above, and beneath prolonged into a kind of tooth. The style is slender, and ends in three short arms terminated by heart-shaped stigmas. The fruit is a capsule.

B. CŒLESTIS (Don. Prod., 44), *B. azurea* (Griff.), *B. javanica* (Bl.), *B. triflora* (Roxb.), *Cryptonema malaccensis* (Turcz), *Nephrocœlium malaccensis* (Turcz), Malay "sisik naga" (Dragon's scales). Widely distributed over India, Mauritius, China, Malaysia and North Australia.

Common in the Malay Peninsula. Singapore—near Pasir Panjang, Tanglin, Changi and other places. Malacca—Merlimau, Pulau Besar. Pahang—Pekan, Kwala Pahang. Penang,—Telok Bahang (C. Curtis). Labuan (Bishop Hose). Borneo, (Beccari).

B. TUBEROSA (Becc.) was described from specimens found by Professor BECCARI in Borneo and New Guinea; nor had any other person, as far as I am aware, ever collected it till I found it growing plentifully in a damp jungle at Chan Chu Kang not very far away from the Selitar bungalow, and I afterwards met with it at Pataling on the Kwala Lumpur Railway in a similar locality. With it, in both places, I found the very curious *Thismia fumida* and also a much commoner plant, *Sciaphila tenella*. It is a very different looking plant to *Burmannia cœlestis*, owing to its saprophytic habits. It is fleshy and, except for the sepals, entirely pure white, about three inches long, but for fully three quarters of its length it is buried in the rotten leaves among which it, like other saprophytes, dwells. It has a small, oblong tuber at the base from which arise a few root hairs. The stem has a few little lanceolate leaves like scales upon it, and the flowers are crowded in a tuft upon the top. They are quite small, and the wings, which are large in *Burmannia cœlestis*, are very obscure here and have almost entirely disappeared. The sepals are bright cowslip yellow, and though the flowers are small and only one or two open at a time, it is really a very pretty little plant and, as BECCARI observes, is sweetly scented.

Singapore—Chan Chu Kang. Bukit Timah near the well of the bungalow. Selangor—Pataling.

B. GRACILIS, n. sp. was discovered by Mr. CURTIS at Tintow in Kedah in 1889, and is apparently an undescribed species. Like *B. tuberosa* it is saprophytic and inhabits dense jungle. The whole plant is from six inches to a foot tall, with a slender branched stem, on which are a few narrow lanceolate scale-like leaves $\frac{1}{8}$ inch long. The inflorescence is a branched cyme, the branches of which are about $\frac{3}{4}$ of an inch long, the flowers few, seven or eight in number, white, pedicelled. The pedicels a quarter of an inch long with lanceolate acute bracts nearly as long (about $\frac{3}{4}$ of the length). The perianth is a quarter of an inch long, elliptic in outline with distinct but not very large wings. The sepals are small, ovate, lanceolate; the petals very much smaller, short and blunt. The upper part of the connective of the anther is bilobed, the lobes denticulate rounded not very dissimilar to those of *B. cælestis*, but rounder, the anther cells are prolonged into somewhat long points, and the central tooth does not descend below them. The style is long, the stigmas reniform, the ovary small, the seeds fusiform acute at both ends.

GYMNOSIPHON is also a saprophytic genus, of which a considerable number of species are widely scattered over the tropical zones. In texture they are more like some of the *Burmannias*, being very fragile and delicate and not fleshy like *Thismia*. The common species here, I thought at first, might be BLUME'S *G. aphyllum*, of which the description is too meagre really to distinguish it. But on examining the herbarium and library of Buitenzorg, where many of BLUME'S types are kept, I found a little rough sketch of BLUME'S plant signed by himself, which is quite unlike our species. There was no specimen in the herbarium. BECCARI in "Malesia" (i., p. 241,) described and figured *G. borneense* from Borneo and *G. papuanum* from New Guinea; BLUME'S *G. aphyllum* comes from Java. According to BLUME'S sketch it has two large bracts at the base of the flower, which does not occur in our species. I have little doubt that the latter is BECCARI'S *G. borneense* although that is represented as rather fleshier and thicker in the stem than the Straits plant.

G. BORNEENSE (Becc.) Malesia, i, 241, Pl. xiv, fig. 5-9). A slender, wiry plant, exceedingly fragile and delicate, about 2 or

3 inches tall, branched and quite leafless except for a few scales. The inflorescence is branched, and the flowers, which are shortly stalked, are arranged on one side of the branches. The whole plant is whitish, except the flower, which is of a pale violet colour. The little flowers are tubular with no wings, and have six small spreading oval perianth-lobes. The fruit is a capsule, covered with the tubular part of the corolla, which becomes skeletonised as the fruit ripens and looks like a network covering it. The seeds are very numerous, dark brown, very small, subglobose with the ends drawn out into short points and covered with low warts or bosses.

It grows in Singapore at Chan Chu Kang and Bukit Timah, in Selangor at Pataling, and in Malacca on Bukit Sadanen. It is found in the densest parts of the forest, and is very fond of appearing on newly cut paths through the forest.

THISMIA.—This genus contains perhaps the most remarkable plants in the order, and indeed some of the most curious of th Malayan region. They are succulent, fugacious herbs, yellow, grey, or red, but never green, and would be taken for fungi by an ordinary observer. About six kinds have been described, of which the most striking forms have been met within Borneo and New Guinea, but other species occur in Ceylon, Burma and Tasmania. They are usually to be met with in damp forests among the dead leaves on the ground, and especially at the foot of old trees. As they are so fleshy and delicate they require to be preserved in spirits of wine, in which, however, though keeping their form unaltered, they become pure white.

Two species are to be found in Singapore, one of which *Th. Aseroe* was collected by Professor BECCAR at Woodlands near Kranji, and has since been found by myself on Bukit Timah. The other is an undescribed species, which I have met with both in Singapore and Selangor, but very rarely, and for which I propose the name of *Th. fumida* on account of its smoky colour.

THISMIA ASEROE, (Becc., Malesia, vol. i, p. 252, Plate 10). A small herbaceous succulent plant about 2 or 3 inches tall with a creeping white rhizome emitting at intervals small tufts of rather thick short roots and flower-stems. Flower-stems

solitary sometimes branched with a few scattered bract-like lanceolate leaves. Flowers terminal and single on each branch, about half an inch long, orange yellow with two lanceolate acute bracts at the base, lower portion of flower tubular obconic, yellow becoming olivaceous brown with a raised reticulate pattern in the interior, which is visible externally when the flower is withering or preserved in alcohol; limb of flower, consists of six segments arranged in a circle and spreading bases triangular from a narrow ring, flat, then suddenly becoming serrate, tubulate, between each a minute extra process. In the centre of the flower is a raised flat-topped ring, surrounding the mouth. The stamen are arranged round the walls of the tube pendulous from a short filament at the top, so that the anthers are on the inner surface next to the walls of the tube. They are of the form of oblong scales, ending below in three acute subulate processes, the largest in the middle; on the inner face are the two narrow linear anthers; opening longitudinally from between them arises a quadrate organ with erose sides. The edges of the stamens meet so as to form a continuous ring. The style is short reddish and scabrid with three very small stigmas. In fruiting the stem thickens and lengthens. The fruit is a cup-shaped capsule light brown, fleshy ribbed, the edges of which project some way above the top of the ovary which when ripe falls off in the form of a small round plate terminated by the style. The seeds are very numerous elliptic oblong in outline and blunt, brown is ribbed.

Singapore, Bukit Timah, near the well. September, 1890; Woodlands, Kranji (Beccari).

Like other saprophytes, this beautiful little plant has a habit of appearing spasmodically and equally suddenly disappearing. In September last I was surprised to find the ground by the stream at Bukit Timah dotted all over with the little yellow stars of this plant appearing from among the dead leaves. I brought a number of plants home and kept them alive under a glass shade for some months, although in the jungle all had disappeared in a week. The rhizomes under cultivation were long persistent and continued to throw up flower stems. The flowers, however, did not produce fruit,

but withered away, and from this and from the peculiar arrangement of the stamens it appears they require the aid of some insect-fertilizer. After fertilization the tube of the flower falls off leaving the basal portion in the form of a cup which increases in size. When the seed is ripe the whole of the top of the ovary becomes detached and with the seeds falls out upon the soil as the fruit becomes too heavy and weighs down its stalk.

THISMIA FUMIDA. n. sp.

A small succulent herbaceous plant more slender and much less conspicuous than the preceding about four inches in height. Rhizome brownish with slender solitary stems bearing one or two flowers. Stems at first whitish, becoming brown when in fruit, with a very small scattered lanceolate acuminate leaves. Flowers much smaller than in *Th. Aseroe* $\frac{3}{8}$ of an inch long and nearly $\frac{1}{2}$ an inch across. The tube almost globose, scabrid narrowed above the ovary and becoming broader above white with pink stripes. The limb consists of six narrow lanceolate acuminate lobes becoming subulate gradually. They rise directly from beneath the central raised ring and there is no outer ring nor small processes as in *Th. Aseroe*. They are greenish grey in colour. The central ring slopes inwards and is not raised above the limb except by its own thickness.

The style is very short with three small recurved stigmas. The capsule is shorter and broader than in the preceding a quarter of an inch each way, the edge crenulate, the outside scabrid, and ribbed. The opening of the ovary half way down the cup is $\frac{1}{8}$ inch across.

Singapore, Chan Chu Kang: Selangor, near Pataling.

Rare and spasmodic at the roots of trees. It is very difficult to find on account of its inconspicuous colours. It is quite easily distinguished by its more slender habit, colour smaller size of the flowers. And the other points mentioned in the description.

TABLE OF SPECIES.

Ovary three-celled, Stamens three,...Burmannia.
Non-saprophytes. Leaves narrow green.
Stem long, creeping, ...B. longifolia.

Stem short, flowers numerous, ...B. disticha.
Annual, flowers few, ...B. cœlestis.
Saprophytes. Leaf reduced to scales.
Flowers crowded in a head, ...B tuberosa.
Flowers scattered on slender branches, ...B. gracilis.
Ovary one-celled, Stamens three, Plant fragile whitish. ...Gymnosiphon borneense.
Ovary one-celled, Stamens six,
Plant succulent brownish. ...Thismia.
Flowers bright yellow. ...Th. Aseroe.
Flowers grey. ...Th. fumida.